

**CLAIMS**

1. A single-crystal lithium fluoride doped with at least 0.018 mol per kg of a divalent positive ion M present in the fluoride state.  
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2. The fluoride as claimed in the preceding claim, characterized in that the ionic radius of divalent M ranges from 55 to 80 picometers.  
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3. The fluoride as claimed in the preceding claim, characterized in that M is present in an amount of at least 0.02 mol/kg.  
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4. The fluoride as claimed in the preceding claim, characterized in that M is present in an amount of at least 0.023 mol/kg.  
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5. The fluoride as claimed in the preceding claim, characterized in that M is present in an amount of at least 0.025 mol/kg.  
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6. The fluoride as claimed in one of the preceding claims, characterized in that M is present in an amount of at most 0.082 mol/kg.  
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7. The fluoride as claimed in the preceding claim, characterized in that M is present in an amount of at most 0.045 mol/kg.  
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8. The fluoride as claimed in one of the preceding claims, characterized in that M is  $Mg^{2+}$ .
9. The fluoride as claimed in one of claims 1 to 7, characterized in that M is  $Co^{2+}$ .  
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10. The fluoride as claimed in one of claims 1 to 7, characterized in that M is  $Zn^{2+}$ .

11. The fluoride as claimed in one of claims 1 to 7, characterized in that M is a mixture of at least two ions chosen from  $Mg^{2+}$ ,  $Zn^{2+}$  and  $Co^{2+}$ .
- 5 12. The fluoride as claimed in one of the preceding claims, characterized in that it is in the form of a cube or parallelepiped.
- 10 13. The fluoride as claimed in one of the preceding claims, characterized in that its volume ranges from  $2.5 \times 10^{-3} \text{ cm}^3$  to  $30 \text{ cm}^3$ .
- 15 14. The fluoride as claimed in the preceding claim, characterized in that its volume ranges from 0.01 to  $20 \text{ cm}^3$ .
15. The fluoride as claimed in one of the preceding claims, characterized in that it has a cleaved surface.
- 20 16. The fluoride as claimed in one of the preceding claims, characterized in that it has a lapped surface that is then treated in acid medium or polished.
- 25 17. An analytical machine that includes a monochromator made of a fluoride of one of the preceding claims.
18. The machine as claimed in the preceding claim, characterized in that it includes at least one scintillator containing a rare-earth halide.
- 30 19. The machine as claimed in the preceding claim, characterized in that the rare-earth halide is  $CeCl_3$ -doped  $LaCl_3$  or  $CeBr_3$ -doped  $LaBr_3$ .
- 35 20. A method of analysis for an element of a specimen using a machine as claimed in one of the preceding machine claims, characterized in that the scintillator is locked onto a line having a wavelength of less than

3 Å.

21. The method as claimed in the preceding claim,  
characterized in that the scintillator is locked onto a  
5 line having a wavelength of less than 2 Å.

22. The method as claimed in the preceding claim,  
characterized in that the scintillator is locked onto a  
line having a wavelength of less than 1.5 Å.

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23. The use of a fluoride as claimed in one of the  
preceding fluoride claims as monochromator.